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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/553,164
Filing Date: July 05, 2006
Appellant(s): TIO, THIAN HOEY

Craig M. Lundell
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/18/2008 appealing from the Office action mailed 6/15/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 4,650,651	Fuderer	3-1987
EP 776,959	Bertaux et al.	11-1996
US 2,324,172	Parkhurst	07-1943

(9) Grounds of Rejection

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuderer (USP 4,650,651) in view of Bertaux et al. (EP 776959) and further in view of Parkhurst (USP 2,324,172).

Regarding claims 1-2, Fuderer discloses a process for preparation of gas containing hydrogen and carbon monoxide from a carbonaceous feedstock, comprising:

- (a) partially oxidizing a carbonaceous feedstock (11) in a vertically oriented tubular partial oxidation reactor vessel having an upper end and a lower end (Fig. 1), the vessel comprising a burner at the upper end (C5/L3-27), thereby obtaining an effluent comprising a first gaseous mixture of hydrogen and carbon monoxide (C5/L3-27);

- (b) catalytically steam reforming a carbonaceous feedstock (1) by feeding a feed of steam (2) and the carbonaceous feedstock (1) to convective steam reformer (Fig. 1) comprising a tubular reactor provided with one or more tubes (4) containing the reforming catalyst, to obtain a steam reforming product;
- (c) feeding the steam reformer product to the upper end of the partial oxidation reactor to obtain a mixture of the effluent of step (a) and the steam reformer product (Fig. 1); and
- (d) providing heat for the steam reforming reaction in step (b) by convective heat exchange between the mixture obtained in step (c) and the steam reformer tubes, thereby obtaining a hydrogen and carbon monoxide containing gas having a reduced temperature (Fig. 1).

Regarding claims 1-2, while Fuderer discloses that the steam to carbon molar ratio of feed to step (b) is controlled (C6/L2-7), with the desire to minimize said ratio (C3/L38-42 and C4/L42-43) the reference does not explicitly disclose said ratio being below 1, and further between 0.5 and 0.9. The specific steam to carbon molar ratio of feed to step (b) is not considered to confer patentability to the claims. As the reactor operating efficiency and product composition are variables that can be modified, among others, by adjusting said steam to carbon molar ratio of feed to step (b), the precise steam to carbon molar ratio of feed to step (b) would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed steam to carbon molar ratio of feed to step (b) cannot be considered critical. Accordingly, one of ordinary

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skill in the art at the time the invention was made would have optimized, by routine experimentation, the steam to carbon molar ratio of feed to step (b) in the process of Fuderer to obtain the desired balance between the operation efficiency and product composition (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

While Fuderer discloses that produced synthesis gas can be used for synthesis of other products (C11/L3-20). While the reference does not explicitly teach that said produced synthesis gas can be used to produce a hydrocarbon stream using a Fischer-Tropsch process, combination of synthesis gas production with Fischer-Tropsch process using synthesis gas to produce hydrocarbons to ultimately produce a base oil, was well known in the art at the time of the invention (as evidenced by Bertaux et al., see C3/L8-C6/L24). It has been held that a process is not patentable where the process is an obvious combination of two processing steps, wherein each processing step lends to end products the desirable properties that each is known to produce when practiced alone and there exists no evidence of co-action between the steps that produces unexpected results. See *In re Fortess and Schoeneberg*, 152 USPQ 13 (CCPA 1966). In the instant case the first processing step comprises production of synthesis gas, as disclosed by Fuderer, and the second processing step comprises using said synthesis to produce a hydrocarbon stream using a Fischer-Tropsch process to ultimately produce a base oil, as disclosed by Bertaux et al.

Further, Bertaux et al. teaches that product stream comprising hydrocarbons having 5 or more carbon atoms is separated and the remaining stream is being used as fuel (C3/L3-29), but the reference does not disclose any other uses for said stream.

Parkhurst teaches that said lower temperature boiling stream (and gaseous stream) separated from the product stream of Fischer-Tropsch process can be not only used as a fuel but also can be recycled to the step producing synthesis gas (P2/L28-54, P2/L74-P3/L15). The reference also teaches that various process operating conditions and economy considerations would dictate where a stream is being recycled to (P2/L28-54).

It would have been obvious to one having ordinary skill in the art at the time of the invention to recycle the stream remaining after separation of hydrocarbons having 5 or more carbon atom from the Fischer-Tropsch product stream in the process of Fuderer in view of Bertaux et al. to the synthesis gas generation step, as taught by Parkhurst, to improve process economy.

Regarding claims 3 and 5, modified Fuderer discloses the process wherein the temperature of the mixture obtained in step (c) is the same or an obvious variant of the claimed temperature of between 800°C to 1050°C. Specifically, the reference discloses that the temperature of the effluent from the step (b) is from about 650°C to about 900°C (C8/L17-20) and that said temperature rapidly raises as the result of the exothermic reactions for example to above 930°C for typical operation before it brought down to from about 900°C to about 1100°C (C8/L28-41). Further the reference discloses that the temperature of the mixture obtained in step (c) may raise rapidly to

about 1100°C (C9/L57-60) and that an ordinary artisan would adjust various operating conditions to control, among others, the temperature of the mixture obtained in step (c) for the purpose of producing sufficient heat to supply the requirements of step (b) (C 12/L7-52). Therefore, the specific temperature of the mixture obtained in step (c) is not considered to confer patentability to the claims. As the reactor operating efficiency and product composition are variables that can be modified, among others, by adjusting said temperature of the mixture obtained in step (c), the precise temperature of the mixture obtained in step (c) would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed temperature of the mixture obtained in step (c) cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the temperature of the mixture obtained in step (c) in the process of modified Fuderer to obtain the desired balance between the operation efficiency and product composition (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (In re Aller, 105 USPQ 223).

Regarding claims 4 and 6-7, modified Fuderer discloses all of the claim limitations as set forth above. Additionally the reference discloses the process further comprising autothermally reforming (ref. 9 & 8) the mixture obtained in step (c) (Fig. 1).

Regarding claims 8-9 modified Fuderer discloses all of the claim limitations as set forth above. Additionally Bertaux et al. discloses the process further comprising steps:

- (g) hydrocracking/hydroisomerizing the hydrocarbon product to form a middle distillate and a residue (C3/L8-C6/L7);
- further comprising subjecting the residue to catalytic dewaxing to obtain a base oil (C3/L8- C6/L7).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuderer (USP 4,650,651) in view of Bertaux et al. (EP 776959), further in view of Parkhurst (USP 2,324,172), and further in view of Eilers et al. (EP 668,342).

Regarding claim 10 modified Fuderer discloses all of the claim limitations as set forth above. Additionally Bertaux et al. discloses that step (g) above uses hydrogen, but the reference does not explicitly disclose any source of said hydrogen (C3/L8-C6/L7).

Eilers et al. teaches that hydrogen used in the hydrocracking/hydroisomerizing step is generated by conventional synthesis gas production step (P7/IA-6). While the reference does not explicitly disclose that synthesis gas has to go through hydrogen recovery unit before being used in hydrocracking/hydroisomerizing step, since synthesis gas comprises other gases in addition to hydrogen, said other gases would have to be, inherently, remove before said synthesis gas can be fed into the hydrocracking/hydroisomerizing step. Therefore, use of hydrogen obtained from synthesis gas in the hydrocracking/hydroisomerizing step of Bertaux et al. would be

obvious to one of ordinary skill in the art, because it would amount to nothing more than a use of a known material for its intended use in a known environment to accomplish entirely expected result.

(10) Response to Argument

Appellant argues that there is no teaching or suggestion in Fuderer of having a steam to hydrocarbon feed ratio below 1. Examiner respectfully disagrees. While Fuderer discloses that the steam to carbon molar ratio of feed to step (b) is controlled (C6/L2-7), with the desire to minimize said ratio (C3/L38-42 and C4/L42-43) the reference does not explicitly disclose said ratio being below 1, and further between 0.5 and 0.9. Fuderer does suggest that the ratio of steam to carbon feed will vary as is known in the art (col. 8, lines 47-49), furthermore, Fuderer does suggest using a preferable steam to hydrocarbon mole ratio from about 2/1 to about 4/1 where the amount of steam added is influenced by the general requirement of avoiding carbon deposition on the catalyst (col. 8, lines 46-56). The specific steam to carbon molar ratio of feed to step (b) is not considered to confer patentability to the claims. As the reactor operating efficiency and product composition are variables that can be modified, among others, by adjusting said steam to carbon molar ratio of feed to step (b), the precise steam to carbon molar ratio of feed to step (b) would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed steam to carbon molar ratio of feed to step (b) cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by

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routine experimentation, the steam to carbon molar ratio of feed to step (b) in the process of Fuderer to obtain the desired balance between the operation efficiency and product composition (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/K. V. H./

Examiner, Art Unit 1795

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